K3 FREQUENCY VALUE ANALYSIS IN A HIGH-RISE BUILDING

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Abstract
Construction projects are jobs that have a high risk of work accidents with the possibility of serious work accidents. The risk of accidents is higher in developing countries where the workforce used in educational backgrounds is relatively low. Related to this condition, King and Hudson (1985).Determination of the frequency of frequency or frequency of the occurrence of K3 Construction Risk to multi-storey buildings, has different values such as rarely, sometimes and often, in accordance with the regulations of the Ministry of Public Works Number: 05 / PRT / M / 2014. i.e. the value = 1 is rare in construction activities,Value 2= Sometimes occurs in construction activities and value = 3 Often occurs in constructal activities. limit the frequency value of the occurrence of the type of risk of K3 construction.
In this study, using fuzzy logic mamdani method. To get the output of this method requires 4 stages, namely; 1) The formation of fuzzy sets; 2) Application of implication function; 3) Composition of rules; 4) Defuzzification, from the results of defuzzifikas

Based on the results of the study can be collected additional values for the limit of the value of K3 frequency, namely; Frequency Value Limit for "Rare" between 0-2, "Sometimes" between 3-5 while for "Often" is 6-8

Keywords: Multi-storey Building, Fuzzy Mamdani, Frequency Value

I. Introduction

The Law on Occupational Safety is featured in Law No. 1 of 1970, which states that every workforce is entitled to protection for its safety in doing work for the welfare of life and increasing national production and productivity.MalayuHasibuan (2003), said that the comfort and health of work (K3) will be able to create better employee maintenance. This K3 must be instilled in each individual employee, which can be done with good counseling and coaching so that they realize the importance of work security for themselves and for the company.CrisRowlley& Keith Jackson (2012), said that: "Health and safety or rather, occupational health and safety, pay attention to risk management issues in the workplace where the risk can end in an accident, injury or poor health".Occupational safety and health is the process of protecting workers in

activities carried out by workers in a company or workplace that involve both physical and spiritual risks of workers. Protection for workers is the obligation of the company to maintain the environment and prevent work accidents.

Occupational safety refers to the protection of physical well-being with the aim of preventing accidents or work-related injuries. Malthis and Jackson (2002) According to John Ridley (2003),Occupational safety is safety related to the engine, aircraft, work tools, materials and processing, the foundation of the workplace and its environment and the ways of doing the work. Occupational safety also refers to a safe working condition and survivors of suffering, damage or loss in the workplace.Occupational safety in one workplace includes a variety of asspek related to the condition and comfort and means of production, human and working procedures. Soehatman Ramli (2009).

According to Suyanto (2011). Fuzzy logic or logic that is vague and can be interpreted as a way to define an input space and output space that has the next value. Fuzzy logic systems have properties that are able to accommodate uncertainties in the process of accumulating a data. Fuzzy logic is defined as a type of logic that is of double value and deals with partial uncertainty and truth.Fuzzy logic is one of the components forming soft computing. Fuzzy logic was first introduced by Prof. Lotfi A. Zadah in 1965.

Fuzzy logic has degrees of membership in the range of 0 to 1. In contrast to digital logic which only has two values of 1 or 0. Fuzzy logic is used to translate a quantity expressed using linguistics, for example the speed of a vehicle expressed slowly, rather quickly, quickly, and very quickly.And fuzzy logic shows the extent to which a value is true and the extent to which a value is false. Fuzzy logic is an appropriate way to map an input space into an output space Siti abidah (2016). Fuzzy is expressed in degrees of membership and degrees of truth.Therefore something can be said to be partly true and partly wrong at the same time. Kusumadewi& Purnomo, (2010)

Research metodhology

In this study there are 2 input variables and 1 output variable. The first output consists of the average of the current experience and condition of the project, while the output is the limit of the frequency value of K3.

Step 1 determines the fuzzy set. A fuzzy set is a group that represents a particular condition or state in a fuzzy variable.

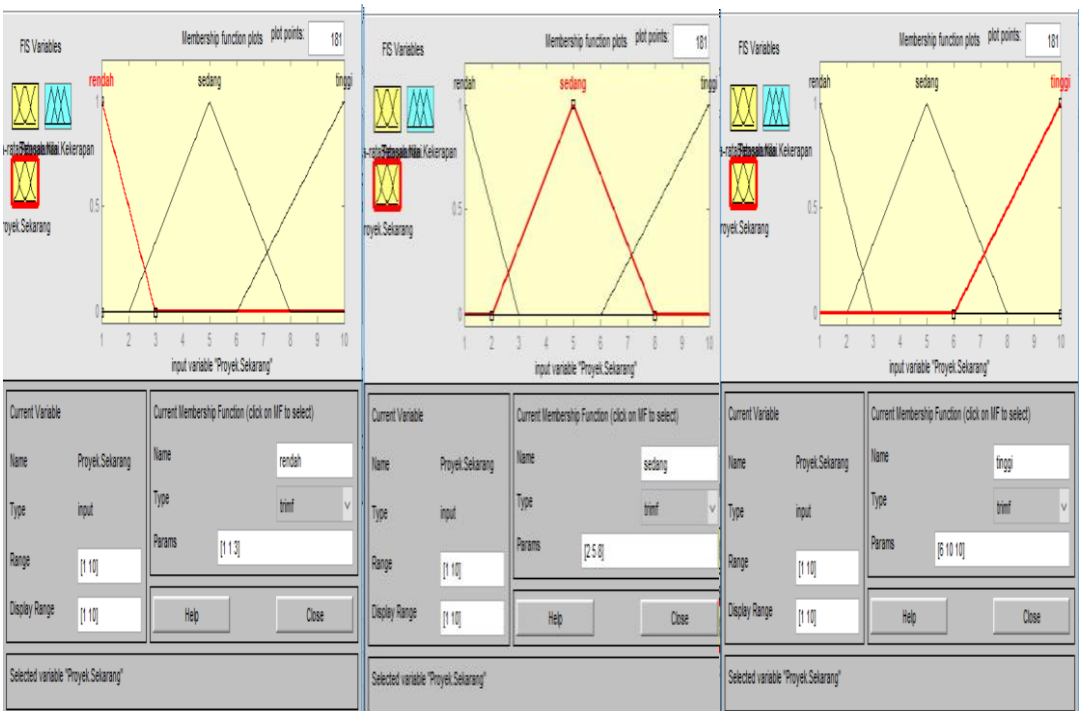
Fuzzy sets in "Experience Average" are divided into 3(three) categories where membership functions are Low, Medium and High. This is based on Pu Candy No. 05 of 2014 About the Value of K3 Risk Level of Construction i.e. (Low, Medium and High), The magnitude of the talk universe value refers to the K3 risk rating of the book "Practical Guidelines for Risk Management In A K3 OHS Risk Perspective. Soehatman Ramli (20016) is for Low (1-3), Medium (4-9) and High (10-16).

Result and discussion

The fuzzy set in "Project Conditions Now" is divided into 3(three) categories where membership functions are Low, Medium and High. This is based on Pu Candy No. 05 of 2014 on the Value of K3 Risk Level construction i.e. (Low, Medium and High), The magnitude of the conversation universe value refers to the K3 risk rating of the book "Practical Guidelines for Risk Management In the Perspective of OHS Risk K3. Soehatman Ramli (20016) is for Low (1-3), Medium (4-9) and High (10-16). Furthermore, the Low, Medium and High membership functions use the shape of a triangular curve. The basic triagular fuzzy number (triangle) is used because this membership function is most commonly used in many studies that are able to deliver results with high precision. According to Cheng, Tsai & Sujono (2010).

The fuzzy set of Project Conditions Now has a low domain [1,1,3], and a medium domain [2,5,8] while a high domain is [6,10,10].

Using the help of MatlabR2013a Software, the input variable Project Conditions can now be displayed with the Fuzzy Logic Mamdani method displayed in figure 4.12 below.

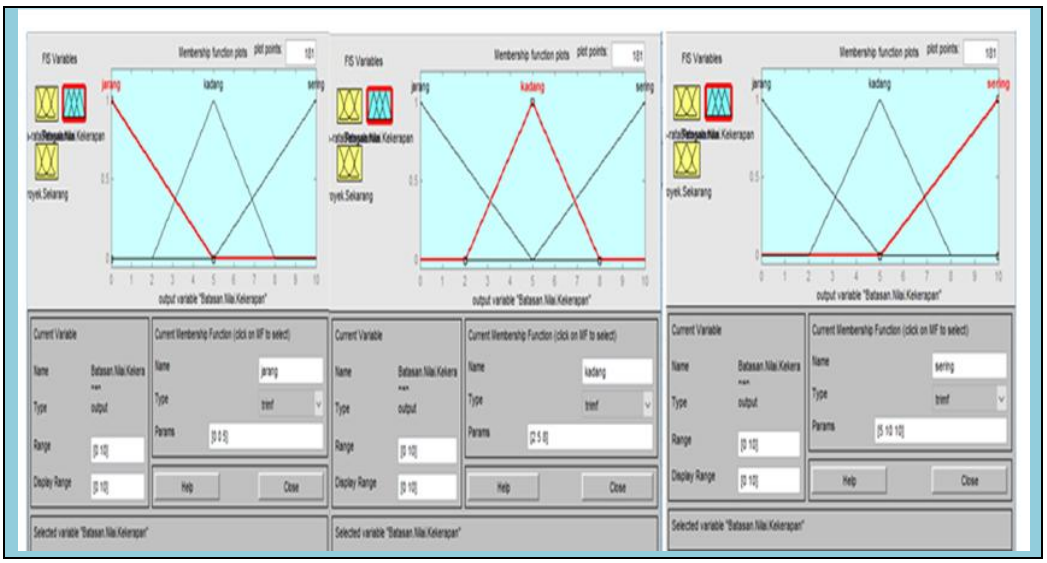


Source: Statistical Processed Results (2020)

The fuzzy set in the "Frequency Value Limit" is divided into 3(three) categories of membership functions namely Low, Medium and High. This is based on Pu Candy No. 05 of 2014 Concerning the Frequency Value of The Occurrence of Construction K3 Risk that is (Sometimes, Rarely and Often). The magnitude of the conversation universe value for the frequency value limit refers to Pu Candy No. 05 of 2014 Concerning the Frequency Value of The Occurrence of K3 Risk construction, namely for Sometimes (0-1), Rare (1-2) and Often (2-3).Next to the membership function Sometimes, Rarely and Often uses the shape

of a triangular curve. The basic triagular fuzzy number (triangle) is used because this membership function is most commonly used in many studies that are able to deliver results with high precision. According to Cheng, Tsai & Sujono (2010).

Using the help of MatlabR2013a Software, the input variable Limit Frequency Value can be displayed with the Fuzzy Logic Mamdani method displayed in figure 1.6 below



Source: Statistical Processed Results (2020)

The next step is to define the rules in a fuzzy inference system (FIS) based on knowledge based. In accordance with the number of inputs there are 82 variables for the Average Experience and Events projected Now have a variable number of 82.

Once the membership process for the enter and output variables is determined, then the rule base can be developed to generate an inference engine by connecting between the enter and output variables. By combining all input variables by applying the rules used is min with the "AND" link. The results of operations with the operator "AND" are expressed as α. Each rule can be written in the following language. If x1 is A1 AND ... AND xn is An THEN y is B Bentuk If-Then Is a form of reasoning-based system statement consisting of a number of fuzzy rules Function rules (rules) using the MIN method.

After an evaluation of the enter and applying the basis of the rules, the fuzzy logic controller will produce an output to be given to the system he controls. Fuzzy logic controllers must convert fuzzy output variables into firm or crisp values that can be used to control the system. In this case the author uses the central point counting method or centroid calculation defuzzification.

Fuzzy logic output data in table 1.7 is grouped and created histogram. The purpose of the histogram is to group any values that fall into the groups "Rare",

"Sometimes" and "Often", so that it will be able to get low and highest values, from the results of the data it turns out that the value 2 as much as 358 and the value of 5 as much as 1303 while the value of 8 as much as 42.

As for knowing each range of K3 risk types, researchers used data from table 1.8, as for finding range values of each type of K3 risk, researchers used the triangle function or triangle curve according to the value of the output of fuzzy.In this case the reference taken is "Sometimes", because it can form a triangular curve. The researcher gave one count, in this case taken variable X72.

CONCLUSION

From the results of the analysis of researchers concluded that to find a limit on the frequency value of the type of risk of K3, using fuzzy logic, there are two input data, namely the average of the experience and experience of the current project, resulting in the output of the K3 risk type frequency value limit. The following will be the answer to the problem formulation.Based on these data obtained limits on the frequency value of the type of risk K3 construction, for the value "Rare" is = 0 - 2, and the value "Sometimes" is = 3 - 5, while for the value "Often" is = 6 - 8.

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